



501049.20503 (20066.84)

#6

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

**Shlomo Ben-Haim, et al**

Serial No.: 10/039,845. : Art Unit: 3762

Filed: October 23, 2001

For: **ELECTRICAL MUSCLE CONTROLLER**

November 12, 2002

**Box: DAC**

Commissioner for Patents and Trademarks  
Washington, D.C. 20231

**TRANSMITTAL LETTER**

**RENEWED PETITION UNDER 37 CFR 1.182**

S I R:

Enclosed herewith are a Supplemental Preliminary Amendment and page 30 of the specification.

Respectfully submitted,

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Assistant Commissioner for Patents  
Washington, D.C. 20231

**SUPPLEMENTAL PRELIMINARY AMENDMENT**

S I R:

Please amend the above application as follows:

**IN THE SPECIFICATION:**

Please insert the attached page 30 between the pages enumerated as pages 29 and 31, respectively.

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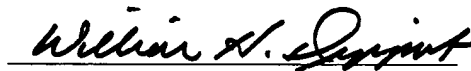
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**REMARKS**

Consistent with (1) Applicant's filing papers wherein the parent application was incorporated by reference and (2) the Decision on Petition dated September 16, 2002, Applicants are incorporating herein page 30. Said incorporation is being made to expedite prosecution. However, notwithstanding the thoughtful Decision, Applicants still maintain that page 30 was in the application papers as filed.

Respectfully submitted,



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the preferred embodiments and from the attached drawings in which:

Fig. 1A is a schematic graph of a typical cardiac muscle action potential;

Fig. 1B is a schematic model of a cardiac muscle cell in an electrical field;

Fig. 2 is a schematic diagram of a heart having segments controlled in accordance with  
5 embodiments of the present invention;

Fig. 3 is a schematic diagram of a segment of right atrial tissue with a plurality of conduction pathways, illustrating the use of fences, in accordance with a preferred embodiment of the present invention;

Fig. 4A is a schematic diagram of an electrical controller connected to a segment of  
10 cardiac muscle, in accordance with a preferred embodiment of the invention;

Fig. 4B is a schematic diagram of an electrical controller connected to a segment of cardiac muscle, in accordance with a preferred embodiment of the invention;

Fig. 5 is a schematic diagram of an experimental setup used for testing the feasibility of some embodiments of the present invention;

15 Figs. 6A-6C are graphs showing the results of various experiments;

Fig. 7A is a graph summarizing results of experimentation on an isolated segment of cardiac muscle fibers, and showing the effect of a delay in applying a pulse in accordance with an embodiment of the invention, on the increase in contractile force;

20 Fig. 7B is a graph summarizing results of experimentation on an isolated segment of cardiac muscle fibers, and showing the effect of a duration of the pulse on the increase in contractile force;

Fig. 7C is a graph summarizing results of experimentation on an isolated segment of cardiac muscle fibers, and showing the effect of a current intensity of the pulse on the increase in contractile force;

25 Fig. 8A is a graph showing the effect of a controlling current on a heart rate, in accordance with a preferred embodiment of the invention;

Fig. 8B is a series of graphs showing the repeatability of increasing contractility in various types of cardiac muscles, in accordance with a preferred embodiment of the invention;

30 Figs. 9-18B are each a series of graphs showing experimental results from experiments in which an isolated rabbit heart was controlled in accordance with an embodiment of the present invention; and

Figs. 19-23 are each a series of graphs showing experimental results from experiments in which an in-vivo rabbit heart was controlled in accordance with an embodiment of the present invention.

### 35 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

One aspect of the present invention relates to controlling and/or modulating the contractility of a cardiac muscle segment and/or the plateau duration of an action potential of the cardiac muscle segment, by applying an electric field or current across the segment. As used herein, the terms, voltage, electric field and current are used interchangeably to refer to



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Attorney Docket: 501049.20503  
Today's Date: November 12, 2002  
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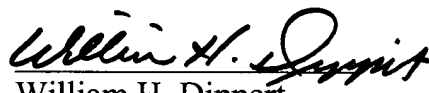
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### FIRST CLASS MAILING CERTIFICATE

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**Deposited: November 12, 2002**

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail under 37 CFR 1.10 on the date indicated above and is addressed to: Commissioner for Patents, Washington, D.C. 20231.

  
William H. Dippert  
Reg. No. 26,723

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